(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 361 826 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication of patent specification: **22.03.95** (51) Int. Cl.[6]: **B41J 25/312**

(21) Application number: **89309722.0**

(22) Date of filing: **25.09.89**

(54) Thermal head supporting means for a thermal printing system.

(30) Priority: **26.09.88 JP 239066/88**

(43) Date of publication of application:
04.04.90 Bulletin 90/14

(45) Publication of the grant of the patent:
22.03.95 Bulletin 95/12

(84) Designated Contracting States:
DE FR GB

(56) References cited:
EP-A- 0 267 580
FR-A- 2 403 889
FR-A- 2 483 025
US-A- 4 560 292
US-A- 4 563 692
US-A- 4 750 880

(73) Proprietor: **SHINKO DENKI KABUSHIKI KAISHA**
12-2, 3-chome, Nihonbashi
Chuo-ku
Tokyo-to (JP)

(72) Inventor: **Okuno, Takeshi**
840 Motomachi
Obata-Cho
Watarai-Gun
Mie-Ken (JP)
Inventor: **Ishiyama, Kiyoshige**
562-37 Ouaza-E
Futami-Cho
Watarai-Gun
Mie-Ken (JP)

(74) Representative: **Gura, Henry Alan et al**
MEWBURN ELLIS
York House
23 Kingsway
London WC2B 6HP (GB)

EP 0 361 826 B1

Description

The present invention relates to a thermal printing system,and more particularly, to a thermal head supporting means for a thermal printing system,having features of light weight,flexibility,ready for adjustment and is especially suitable for an open-frame type thermal printing system, namely, one in which the frame is separated into two pieces, an upper frame and a lower frame,and the former is hinged onto the latter so as to be swingably movable upward and downward and,further,superior accuracy of printing.

A thermal printing system,generally,functions to print alphanumeric and or image information on a paper sheet by melting thermaly fusible ink applied on the surface of a thermal printing ribbon or ribbons,by means of passing both a paper sheet and thermal printing ribbon being overlapped, through a gap between a thermal head and a platen roller, and it has various features such as small size,light weight yet allowing multi-colour printing in a quite a simple way.

In order to make the density of the printed letters or images more uniform and to improve the cleanliness by using a thermal printing system of this kind,it is very important to satisfy following two requirements,that is,to make a depression force between a thermal head and a mating platen roller in the direction transverse to the width of paper sheet more uniform,and at the same time to perfectly align the axis line of the platen with the location of each of the heating elements in the thermal head.

Because of this,it has been required for most thermal printing system to adjust their pressure force in the transverse direction as uniformly as possible by means of an adjusting screw or screws,while to align the axis line of the platen roller with each heating element relying on the dimensional accuracy of the related parts or components.

Fig.1 is a side view showing the structural features of the thermal head supporting means of a conventional general type thermal printing system.

In the drawing,a thermal head 50 held by a head holder 31 is pressed against a platen 21,and a thermal printing paper and a printing ribbon being overlapped with each other are passed through the gap between these two members and further fed upward by the platen roller 21.

The head holder 31 is disposed around a head holder shaft 31a rotatably received by the same frame carrying said platen roller 21 and is pulled rightward by a tension spring 7 so that the thermal head 50 can be depressed upon the platen roller 21.

The extent of the pressure force mentioned above can be adjusted by an adjustment screw 37 disposed on both sides of the head holder 31 so as to be uniform in the direction transverse to the direction of the paper sheet 5.

In the drawing,numeral 38 denotes a sensor for detecting the position of a printing ribbon 4,numeral 39 denotes a sensor holder,similarly,numeral 37'is a locking screw for fixing the adjustment screw 37 and 41 denotes a heat sink for radiating heat given from the thermal head 50.

However,there found following defects in the aforesaid conventional thermal head supporting means,that is:

1) Adjustment is required to maintain the depression force uniform between the thermal head and platen roller.

2) The construction of the supporting means inevitably becomes complicated due to such adjustment means.

In order to obviate such drawbacks as explained above, the inventors of the present invention proposed a prior invention directed to a supporting means for a thermal head which enables to maintain uniform pressure force between a thermal head and a platen roller,and filed a patent application[Japanese Patent Application No.Sho 60-(1985)-15686, published as Japanese Patent Laid-Open(Un-examined) Publication No.Sho 62(1987)-611670].

Fig.2 is a schematic side view showing the main portion of the above-mentioned thermal head supporting means,wherein a paper sheet 5 from a roller R_1 is fed via a roller R_2 onto the outer periphery of a platen roller 21 and then fed leftwards by turning back along the outer periphery of the platen roller 21.

On the other hand,an ink ribbon 4 applied with thermally fusible printing ink is also drawn from a roller R_3 and overlapped with the paper sheet 5 on the outer periphery of the platen roller 21 and then taken up by a take-up roller 39.

The thermal head supporting means as explained above and shown in Fig.3A and 3B is composed of following three main components,:

1).a hinge shaft 40 located by passing transversely through both outer side frames 30a and 30b and placed in parallel with the platen roller 21,

2).a head holder 31 fitted around the outer periphery of the platen roller 21 through a rolling bearing 35 and positioned halfway between the hinge shaft 40 and the platen roller 21 and holds a thermal head 50 at the side confronting with the platen roller 21,and

3).a pair of coil springs 7a and 7b attached at both axial ends of the head holder 31 so as to resiliently urge the head holder 31 against the

shaft of the platen wheel 21.

Being constructed as explained above,the head holder 31 can be swung to and fro around the hinge shaft 40 via the rolling bearings 35.

In addition,the pressure force exerted between the platen roller 21 and the thermal head can be made uniform over the entire width of the printing paper,and by virtue of this prior type thermal head supporting means,an entirely uniform pressure force can be assured between the thermal head and the platen roller with no particular adjustment.

It is to be noted,however,that the head holder 31 of the prior invention consists of,

1) a frame member 32 having its transverse width almost the same as that of the outer frames 30a and 30b and its configuration alike squared U shape seen in plan view, and

2) a supporting member 33 carrying a ball bearing 35 on the opened face side.

Both side walls 32a,32b and a transverse connecting bar 32c of the frame member 32 are integrally formed by such means as aluminum alloy die casting technique or the like, and these members themselves have a considerable size together with a significant weight.

Moreover, a supporting member 33 of considerably large size is assembled with both the side walls 32a and 32b at the open left side end by means of a hinge shaft 40 which passes through the two side walls 32a,32b and the supporting member 33 interposed between the two side frames.

Consequently, the supporting means of the inventors' aforesaid prior invention, consisting of the squared U shaped frame, the hinge shaft 40 and the supporting member 33, constitute a rigid construction as a kind of panelled wall and yet being large both in size and weight.

Fig. 3C is a schematic plan view showing general shape and construction of the supporting means as mentioned above.

Another prior art example of a head supporting means, similar in many respects to the illustrated means described above, can be found in US 4,750,880. This arrangement also includes cam means which can be used to move the thermal head against the spring force urging it towards the platen.

According to the present invention a thermal printing means is provided comprising a thermal head attached to a thermal head supporting plate mounted on a supporting shaft extending transversely between opposite side frames for pivotable displacement of the thermal head, resilient means acting to pivot the supporting plate on said shaft to urge the thermal head towards a platen roller under the control of cam means, for printing to be performed on a sheet resiliently clamped between said thermal head and platen roller when said head and roller are in an operative position relative to each other, the cam means acting on a forward portion of a lever assembly, mounted independently of the supporting plate through laterally spaced rear portions, to transmit movements of the cam means to the thermal head, the resilient means being disposed at an intermediate portion of the lever assembly and act between the lever assembly and the thermal head, and stop means on the supporting shaft providing a location for a portion of the supporting plate through which the thermal head is mounted on the shaft in a one-point centrally supported manner.

It is possible to arrange that a thermal head supporting means having such features will satisfy the requirements of small size, light weight, ease of manufacture and uniform pressure force between the thermal head and the platen roller with no particular adjustment.

Yet another object of the present invention is to provide a thermal head supporting means in which the pressure force between the thermal head and the platen roller is applied on the central part of a supporting shaft in a range as small as possible to obviate any wavy movement of the thermal head and to allow the thermal head to separate from the platen roller when the printing system is not under its printing operation.

Preferably, each of the parts or components constituting the thermal printing means according to the present invention is designed to be small in size, thin and having such a shape as can be readily fabricated by punching or press forming of sheet metal or by moulding plastic material.

By constructing the thermal printing means as a light-weight unit with a one-point central supporting arrangement, it is possible to assure more readily a uniform pressure force against the platen roller. Thus it can be especially suitable for use in an open frame type thermal printing system wherein an upper frame can be swung upward or swung down to take its set position to its mating lower frame.

Preferably, the supporting plate is formed with a pair of oblong through holes each being normal to the supporting shaft and directed towards a shaft of the cam means for urging the thermal head so as to allow fine adjustment of the thermal head in a direction normal to the platen shaft.

An embodiment of the invention will now be described in more detail with reference to Figs. 4 and 5A, B and C of the accompanying drawings. In the drawings:

Fig. 1 is a schematic side view showing the relative positions of a general prior type of thermal printing means,

Fig. 2 is a schematic side view showing the relative positions of an improved thermal printing means, platen roller, ink ribbon and a printing paper as a prior invention proposed by the inventors of the present invention,

Figs. 3A and 3B are, respectively, a plan view and a side view of the thermal printing means of Fig. 2.

Fig. 3C is a schematic plan view showing the relative shape and size of the thermal head holder shown in Fig. 3A,

Fig. 4 is a schematic side view of an open-frame type thermal printing system provided with a thermal printing means according to the invention, and

Fig. 5A is a schematic plan view of the thermal printing means of Fig. 4,

Fig. 5B is a side view to a larger scale of the thermal printing means of Fig. 4, and

Fig. 5C is a side view of a pair of micro-switches and a pair of micro-switch cams of the thermal printing means of Fig. 4.

Numeral 10 in Fig. 4 indicates the entire thermal head supporting means almost the whole of which shown by dotted lines. Reference 21 is a platen roller, and 14 are head guide posts, which slidably receive a thermal head 50 through a pair of ball bearings 15, relative to a pair of oblong holes 14' extending almost vertically on each of a pair of upper side frames 18 and 19.

The pair of oblong holes 14' are formed to have a length corresponding to the pivoting stroke of the head guide post 14 as actuated by a head depressing cam, which will be explained later. Numerals 25 and 26 are, respective lower side frames at the right and the left sides of the printer, and numerals 27 and 27' are, respective upwardly opened recesses for holding a ball bearing which receives each of the guide posts 14 when the upper side frames 18 and 19 are swung down to be engaged with the inside of the lower side frames 25 and 26.

Adjustment is made under this engaged state, so that relative location of the heating element normal to the platen shaft and its parallelism can be assured.

Fig. 5A is a plan view of the thermal head supporting means. In the drawing, numeral 9 is a head supporting shaft which acts as a pivot shaft through a thermal head urging lever explained later, so as to urge the thermal head 50 against the platen roller 21 or to have it move away from the platen roller 21 by the aid of a thermal head retracting plate 11. The pivot shaft 9 passes through both right and left upper side frames 18 and 19 and is further fixed, at each axial end, to each upper side frame by a set screw.

Numeral 8 in the drawings is a thermal head supporting plate, L-shaped in cross-section and fabricated from a metal plate. It has two flat portions each perpendicular to the other, and one of the flat portions 8' is secured along the rear face of the thermal head 50 by a set screw or screws, while the other flat portion 8" is formed with an oblong through hole 8"', through which the head supporting shaft 9 can pass and which is parallel to the side face of the thermal head 50.

By virtue of this construction, for assembly the thermal head supporting shaft 9 is passed through the oblong hole 8"' and the flat portion 8" is resiliently positioned being urged by a spring 24 against a fixed stopper ring 24' attached on the supporting shaft 9. Thereby the flat portion 8" of the thermal head supporting plate plays a role as an arm for swingably holding the thermal head 50.

The fixed stopper ring 24' is composed of a pair of rings, and if one ring (the left side ring in the drawing) is located at the center of the supporting shaft 9, the thermal head supporting plate 8 can be held at the central position of the thermal head supporting shaft 9, and thus any side play, namely, any wavy motion of the thermal head along the head supporting shaft leading to slipping off of the printed dots can be prevented from occurring.

Numeral 10' denotes a thermal head urging lever as a thin member that can be fabricated either by punching and bending a metal plate or by molding plastic material, which lever has a configuration like an inverted, thick and short "T" seen in plan view and being composed of three parts 10'A,10'B and 10'C as explained later.

10'A is a top plate having almost a rectangular contour and the interior part of which is punched out to reduce its weight, and 10'B is a front portion formed by being bent downwards at the front end of the top plate and then bent again to project forwards, and 10'C indicates side portions bent downward to depend from the side edges of the top plate 10'A with a rear portion descending obliquely rearwards to constitute connecting arms 10'D.

Numeral 11 is a thermal head retracting plate tightly secured, by a set screw or by spot welding, to the top plate 10'A at the portion adjacent to its forward end and is raised further by being bent upwards at right-angles to predetermined height at a position slightly before the forward end of the top plate, and being again bent at right-angles to extend forwards at that height. This thermal head retracting plate 11 is far smaller in size and much lighter than the above-mentioned thermal head urging lever 10'.

A parallel spacing between the forward end portion 10'B of the thermal head urging lever and

the thermal head retracting plate 11 is set up corresponding to the diameter of the head urging cam 12 to be slidably disposed between these two members, thereby the difference between the maximum diameter portion and the minimum diameter portion of the head urging cam determines the swing or stroke of the thermal head 50.

Numeral 13 is a thermal head urging cam shaft extending between the upper side frames 18 and 19 at both sides of the device and is driven by a motor 16 through a set of gears 17 to rotate the head urging cam 12.

Numeral 6 in Figs. 5A and 5B denotes a spring guide post inserted through the hole opened at the transversely central part near the frontmost end of the top plate 10'A of the thermal head urging lever 10', which guide post consists of a head formed with a slot for receiving the tip of a screw driver for turning, a neck extending to the top face of the thermal head 50 and a threaded portion under the neck threaded with male thread(s) which threadably engages the female thread formed on the thermal head, and thereby the extent of projection of the spring guide post beyond the top plate 10'A can be adjusted.

7 is a thermal head urging spring disposed around the above-mentioned spring guide post 6 and in a gap between the top face of the thermal head 50 and the reverse face of the thermal head urging lever 10', and thus it acts to resiliently transmit an urging force imparted by the thermal head urging lever 10' to the thermal head 50. In addition, the spring force of the urging spring 7 can be adjusted by adjusting the amount that the unthreaded shank of the spring guide post 6 projects.

28 and 28' are a pair of micro-switches, while 29 and 29' are also a pair of switch cams. The micro-switch 28 and switch cam 29 make up a cooperating group and similarly the micro-switch 28' and switch cam 29' make up another cooperating group.

Explanation will be made hereunder on the operation in general, function of pressing and supporting effected by the depressing means of the present invention.

When it becomes necessary to press the thermal head 50 against the platen roller 21 due to an applied signal instructing the start of printing. Y-(yellow) colour, the thermal head urging cam 12 is rotated by a motor 16 to depress the thermal head urging lever 10', thereby the thermal head is pressed against the outer surface of the platen roller 21. Then the micro-switch 28 is turned ON by the switch cam 29 and stops the rotation of the thermal head urging cam 12.

In this position, since the maximum diameter portion of the head urging cam 12 engages the frontmost end portion 10'B of the thermal head urging lever 10', this presses the thermal head 50 against the platen roller.

When it becomes necessary, after having finished the printing Y(yellow), to retract the thermal head 50 away from the platen roller 21 immediately before rolling back the paper sheet ready for subsequent M(magenta) printing, the thermal head retracting plate 11 is raised upward by rotating the motor to retract the thermal head, then the thermal head urging cam 12 is stopped by the micro-switch 28'.

Rotation of the thermal head urging cam 12 accompanies rotation of the switch cam 29 and allows subsequent rotation of the thermal head urging cam for next printing.

As already explained, the thermal head 50 is secured, at the central part of its rear end face, to one flat face of the thermal head supporting plate 8, while the other flat face of the head supporting plate 8 is resiliently and swingably supported with respect to the head supporting shaft 9 which passes through the oblong hole 8''' formed through the flat face of the head supporting plate 8, as a consequence the thermal head 50 is supported in the manner of a so-called one-point central type of support.

In addition, by virtue of the oblong hole 8''', the thermal head supporting plate 8 is allowed to move in a direction normal to the axis of the supporting shaft, for effecting fine adjustment with respect to the supporting shaft 9.

In a state where the thermal head 50 and subassembly of the thermal head urging lever 10' and the thermal head retracting plate 11 (referred to as a "head urging lever assembly") are coupled together, the head supporting shaft 9 is passed through and the head urging cam is positioned between the head urging lever 10' and the head retracting plate 11. Thus, the thermal head 50 and the head urging lever assembly as a whole functions as a thermal head depressing unit.

Since all of the thermal head supporting plate, the head urging lever and the head retracting plate constituting a thermal head urging unit are fabricated by press working of thin sheet metal or plates, and yet the transverse width of the thermal head urging lever is less than one half the spacing between two side frames and the central portion of the urging lever is punched out, the thermal head urging unit is remarkably smaller in size and light in weight as compared with thermal head holders of the prior art.

In addition,since the thermal head urging unit of this type is tightly coupled to the head supporting shaft 9 at its axial center by the head supporting plate under a spring force and in a one-point central support manner,there is no fear that the point of support should shift to cause wavy motion.

Fine adjustment both forward and backward normal to the supporting axis is permitted by the oblong hole formed through the supporting plate 8.

Furthermore,holes formed in the side frames at right and left side through which the head support shaft and the, head urging cam shaft are passed,can be formed by means of precise pressing technique,so the positioning of these holes can be secured correctly,so the perpendicularity of both the supporting shaft 9 and the head urging cam shaft 13 with respect to both side frames,namely,the parallelism of these two shafts also can be assured.

Since the thermal head supporting means of the present invention is positioned and adjusted such that the relative position of the heating element of the thermal head and the platen roller in the direction normal to the axis of the platen,and the parallelism of these two members can be assured,in a state where the two upper side frames 18 and 19 are swung down and coupled to the lower side frame 25 and 26,the pressure force applied to the thermal head as shown in the above-mentioned embodiment is restricted to an axial width of the top face 10'A of the thermal head urging lever 10',which is really a short extent less than one half of the length of span between the two upper side frames 18 and 19,therefore it does not restrain the overall length of the thermal head.

As the thermal head 50 is received,at both its axial ends,by the head guide post 14 and via a pair of ball bearrings 15 in the oblong holes 14',respectively,sufficient freedom is given for machining,assembling and adjustment.

When the maximum diameter portion of the head urging cam engages the front end portion of the urging lever 10', a pressure force is smoothly applied to the platen roller by the thermal head urging lever through the urging spring.

If the thermal head urging cam further rotates,the head retracting plate is gradualy raised and the thermal head urging unit is moved to leave away from the platen roller. On the other hand,when the minimum diameter portion of the thermal head urging cam engages the head retracting plate 11,the distance of the retracted thermal head from the platen roller becomes maximum.

Claims

1. Thermal printing means comprising a thermal head (50) attached to a thermal head supporting plate (8) mounted on a supporting shaft (9) extending transversely between opposite side frames (18,19) for pivotable displacement of the thermal head, resilient means (7) acting to pivot the supporting plate on said shaft to urge the thermal head towards a platen roller (21) under the control of cam means (12), for printing to be performed on a sheet resiliently clamped between said thermal head and platen roller when said head and roller are in an operative position relative to each other,
characterised in that
the cam means (12) act on a forward portion of a lever assembly (10'), mounted independently of the supporting plate (8) through laterally spaced rear portions (10'D), to transmit movements of the cam means to the thermal head,
the resilient means (7) is disposed at an intermediate portion of the lever assembly (10') and acts between the lever assembly and the thermal head (50), and
stop means (24') on the supporting shaft (9) provide a location for a portion (8") of the supporting plate through which the thermal head (50) is mounted on the shaft in a one-point centrally supported manner.

2. Thermal printing means as claimed in claim 1, wherein said thermal head supporting plate (8) is made of sheet metal or a plastic material or materials and has a portion formed with a hole (8"') elongated towards said cam means (12) by means of which it is fitted onto said thermal head supporting shaft (9) so as to permit fine adjustment of the thermal head in a direction normal to the platen roller (21).

3. Thermal printing means as claimed in claim 1 or claim 2, wherein said lever assembly (10') is a unitary plate-like member made of sheet metal or a plastic material or materials as a single-piece member comprising opposite side portions (10'C) which include said rear portions (10'D) each having a through hole for receiving said thermal head supporting shaft (9) such that said thermal head supporting plate (8) is interposed between said side portions (10'C), a top portion (10'A) extending between said side portions and arranged to have the thermal head (50) connected to it at a spacing below it, and a front portion (10'B) projecting forward from said top portion for cooperation with said cam means (12).

4. Thermal printing means as claimed in claim 3 wherein said lever assembly top portion has a weight-reducing aperture and said rear portions are formed to depend from said top portion as obliquely descending portions.

5. Thermal printing means as claimed in any one of claims 1 to 4, wherein said cam means comprises an eccentric cam wheel (12) and

the lever assembly has a portion (10'B) projecting forwards generally parallel to the top face of the thermal head (50), a retracting arm (11) extending above and parallel to said portion (10'B) and being spaced therefrom at a predetermined distance to define an opening equal to the diameter of said cam wheel so as to receive said cam wheel therebetween.

6. Thermal printing means as claimed in any one of claims 1 to 5, wherein said thermal head (50) and said lever assembly (10') are adjustably connected by a spring guide post (6) secured to said thermal head and extending upwards in an adjustable manner through a hole of said thermal head formed in a transversely central region and towards the front end thereof, and said resilient means comprises a spring (7) disposed around said spring guide post between the top of said thermal head and the reverse face of said lever assembly, whereby the action of the cam means (12) on said lever assembly can be transmitted resiliently and adjustably to the transversely central region of the thermal head.

7. Thermal printing means as claimed in any one of claims 1 to 6 and being of the open frame type, wherein said side frames (18,19) are on an upper frame of the printing means and the platen roller (21) is mounted on a lower frame of said printing means, said thermal head (50) being mounted between said side frames by a pair of guide posts (14) at opposite transverse ends of said thermal head, and said lower frame having a pair of recesses (27,27') so located relative to the platen roller as to ensure both the parallelism and relative position between said thermal head and said platen roller can be determined when said upper frame is lowered and coupled to said lower frame and said head guide posts have been received by said recesses for placing the thermal printing system ready for a printing operation.

Patentansprüche

1. Thermo-Druckmittel, umfassend einen Thermo-Kopf (50), der an einer Thermokopftragplatte (8) befestigt ist, die auf einer Tragwelle (9) montiert ist, die sich quer zwischen gegenüberliegenden Seitenrahmen (18,19) zur schwenkbaren Versetzung des Thermo-Kopfes erstreckt, elastische Mittel (7), die dazu dienen, die Tragplatte auf der Welle zu schwenken, um den Thermo-Kopf unter der Steuerung von Nockenmitteln (12) zu einer Schreibwalze (21) hin zu drängen, um einen Druckvorgang auf einem zwischen dem Thermo-Kopf und der Schreibwalze elastisch eingeklemmten Blatt durchzuführen, wenn Kopf und Walze relativ zueinander in der Betriebsposition sind, dadurch gekennzeichnet, daß
die Nockenmittel (12) auf einem vorderen Abschnitt einer Hebelanordnung (10') arbeiten, die unabhängig von der Tragplatte (8) durch lateral beabstandete hintere Abschnitte (10'D) montiert ist, um Bewegungen der Nockenmittel auf den Thermo-Kopf zu übertragen,
wobei die elastischen Mittel (7) an einem Zwischenabschnitt der Hebelanordnung (10') angeordnet sind und zwischen der Hebelanordnung und dem Thermo-Kopf (50) wirken,
und Anschlag- bzw. Stopmittel (24') auf der Tragwelle (9) eine Ortsfestlegung für einen Abschnitt bzw. Teil (8") der Tragplatte schaffen, wodurch der Thermo-Kopf (50) auf der Welle in einer zentralen Ein-Punkt-Lagerung montiert ist.

2. Thermo-Druckmittel nach Anspruch 1, worin die Thermokopftragplatte (8) aus Blech oder einem Kunststoffmaterial oder -materialien gebildet ist und einen Abschnitt mit einem ausgebildeten Loch (8"') aufweist, das zu den Nokkenmitteln (12) hin länglich ist, womit es auf die Thermokopftragwelle (9) aufgepaßt ist, um eine Feineinstellung des Thermo-Kopfes in eine Richtung normal zur Schreibwalze (21) zu erlauben.

3. Thermo-Druckmittel nach Anspruch 1 oder 2, worin die Hebelanordnung (10') ein plattenähnliches Einheitselement ist, das aus Blech oder einem Kunststoffmaterial oder -materialien als einstückiges Element hergestellt ist, umfassend gegenüberliegende Seitenabschnitte (10'C), die die hinteren Abschnitte (10'D) einschließen, von denen jeder ein Durchgangsloch zur Aufnahme der Thermokopftragwelle (9) aufweist, sodaß die Thermokopftragplatte (8) zwischen den Seitenabschnitten (10'C) angeordnet ist, einen oberen Abschnitt (10'A), der sich zwischen den Seitenabschnitten erstreckt und so angeordnet ist, daß der Thermo-Kopf (50) damit in einem Abstand darunter verbunden ist, und einen Vorderabschnitt (10'B), der sich nach vorne vom oberen Abschnitt erstreckt, um mit den Nockenmitteln (12) zusammenzuarbeiten.

4. Thermo-Druckmittel nach Anspruch 3, worin der obere Abschnitt der Hebelanordnung eine gewichtsreduzierende Öffnung hat und die hinteren Abschnitte so ausgebildet sind, daß sie vom oberen Abschnitt als schräg abfallende

Abschnitte herabhängen.

5. Thermo-Druckmittel nach einem der Ansprüche 1 bis 4, worin die Nockenmittel ein exzentrisches Nockenrad (12) umfassen und die Hebelanordnung einen Abschnitt (10'B) aufweist, der allgemein parallel zur oberen Fläche des Thermo-Kopfes (50) nach vorne ragt, wobei ein Rückzugarm (11) sich oberhalb und parallel zum Abschnitt (10'B) erstreckt und davon um eine vorbestimmte Distanz beabstandet ist, um eine Öffnung zu definieren, die gleich dem Durchmesser des Nockenrades ist, um das Nockenrad dazwischen aufzunehmen.

6. Thermo-Druckmittel nach einem der Ansprüche 1 bis 5, worin der Thermo-Kopf (50) und die Hebelanordnung (10') durch einen Federführungsstift (6) einstellbar verbunden sind, der am Thermo-Kopf befestigt ist und sich nach oben in einstellbarer Weise durch ein Loch des Thermo-Kopfes erstreckt, das in einer quergerichteten Mittelregion und zu dessen vorderen Ende hin ausgebildet ist, und worin das elastische Mittel eine Feder (7) umfaßt, die um den Federführungsstift herum zwischen der Oberseite des Thermo-Kopfes und der Rückfläche der Hebelanordnung angeordnet ist, wobei die Wirkung der Nockenmittel (12) auf die Hebelanordnung elastisch und einstellbar zur quergerichteten Mittelregion des Thermo-Kopfes übertragen werden kann.

7. Thermo-Druckmittel nach einem der Ansprüche 1 bis 6 und vom Typ mit offenem Rahmen, worin die Rahmen (18,19) auf einem oberen Rahmen des Druckmittels vorgesehen sind und die Schreibwalze (21) auf einem unteren Rahmen des Druckmittels montiert ist, wobei der Thermo-Kopf (50) zwischen den Seitenrahmen durch ein Paar Führungsstifte (14) an gegenüberliegenden Querenden des Thermo-Kopfes montiert ist, und der untere Rahmen ein Paar Ausnehmungen (27,27') aufweist, die so relativ zur Schreibwalze angeordnet sind, sodaß sowohl die Parallelstellung als auch die Relativposition zwischen Thermo-Kopf und Schreibwalze sichergestellt ist, was bestimmt werden kann, wenn der obere Rahmen gesenkt und mit dem unteren Rahmen gekoppelt wird und die Kopfführungsstifte von den Ausnehmungen aufgenommen wurden, um damit das Thermodrucksystem in Bereitschaftsstellung für einen Druckvorgang zu bringen.

Revendications

1. Moyen d'impression thermique comprenant une tête thermique (50) fixée à une plaque de support de tête thermique (8) montée sur un arbre de support (9) s'étendant transversalement entre des bâtis latéraux opposés (18, 19) pour déplacement pivotant de la tête thermique, des moyens élastiques (7) agissant pour faire pivoter la plaque de support sur ledit arbre pour solliciter la tête thermique vers un rouleau d'impression (21) sous la commande d'un moyen formant came (12), pour impression à accomplir sur une feuille serrée élastiquement entre ladite tête thermique et le rouleau d'impression lorsque la tête et le rouleau sont en position opérative l'une par rapport à l'autre,
caractérisé en ce que
le moyen formant came (12) agit sur une portion avant d'un ensemble à leviers (10'), monté indépendamment de la plaque de support (8) par des parties arrière latéralement espacées (10'D), pour transmettre des mouvements du moyen formant came à la tête thermique,
le moyen élastique (7) est disposé à une partie intermédiaire de l'ensemble à leviers (10') et agit entre l'ensemble à leviers et la tête thermique (50), et
un moyen d'arrêt (24') sur l'arbre de support (9) permet un emplacement pour une partie (8") de la plaque de support à travers laquelle la tête thermique (50) est montée sur l'arbre d'une manière supportée centralement en un point.

2. Moyen d'impression thermique comme revendiqué en revendication 1, dans lequel la plaque de support de la tête thermique précitée (8) est réalisée en métal, en une matière plastique ou en matériaux en feuille et a une partie formée d'un trou (8"') allongée vers le moyen formant came précité (12) au moyen duquel elle est rapportée sur l'arbre de support de la tête thermique précitée (9) afin de permettre un réglage fin de la tête thermique dans une direction normale au rouleau d'impression (21).

3. Moyen d'impression thermique comme revendiqué en revendication 1 ou revendication 2, dans lequel l'ensemble à leviers précité (10') est un élément unitaire en forme de plaque réalisé en métal ou une matière plastique ou un matériau en feuille en un élément à pièce unique comprenant des parties latérales opposées (10'C) qui comprennent les parties arrière précitées (10'D) ayant chacune un trou traver-

sant pour recevoir l'arbre de support de la tête thermique précitée (9) de sorte que la plaque de support de la tête thermique précitée (8) est interposée entre lesdites parties latérales (10'C), une partie supérieure (10'A) s'étendant entre lesdites parties latérales et agencée pour comporter la tête thermique (50) reliée à celles-ci à un espace en dessous d'elles, et une partie avant (10'B) faisant saillie en avant de la partie supérieure pour coopération avec le moyen formant came précité (12).

4. Moyen d'impression thermique comme revendiqué en revendication 3, dans lequel la partie supérieure de l'ensemble à leviers précité a une ouverture de réduction de poids et les parties arrière précitées sont formées pour dépendre de ladite partie supérieure comme partie descendant obliquement.

5. Moyen d'impression thermique comme revendiqué dans l'une quelconque des revendications 1 à 4, dans lequel le moyen formant came précité comprend une roue de came excentrique (12) et l'ensemble à leviers a une partie (10'B) faisant saillie en avant généralement parallèle à la face supérieure de la tête thermique (50), un bras de rétraction (11) s'étendant au-dessus et parallèle à ladite partie (10'B) et étant espacé de celle-ci à une distance prédéterminée pour définir une ouverture égale au diamètre de ladite roue de came afin de recevoir entre eux ladite roue de came.

6. Moyen d'impression thermique comme revendiqué dans l'une quelconque des revendications 1 à 5, dans lequel la tête thermique précitée (50) et l'ensemble à leviers précité (10') sont reliés de façon réglable par un axe de guidage élastique (6) fixé à ladite tête thermique et s'étendant vers le haut d'une manière réglable à travers un trou de ladite tête thermique formé dans une région transversalement centrale et vers l'extrémité avant de celle-ci, et le moyen élastique précité comprend un ressort (7) disposé autour dudit axe de guidage élastique entre le haut de la tête thermique et la face inverse de l'ensemble à leviers, de la sorte l'action du moyen formant came (12) sur ledit ensemble à leviers peut être transmise élastiquement et de façon réglable à la région transversalement centrale de la tête thermique.

7. Moyen d'impression thermique comme revendiqué dans l'une quelconque des revendications 1 à 6 et étant du type à bâti ouvert, dans lequel les bâtis latéraux précités (18, 19) sont sur un châssis supérieur du moyen d'impression et le rouleau d'impression (21) est monté sur un châssis inférieur du moyen d'impression, la tête thermique précitée (50) étant montée entre lesdits bâtis latéraux par une paire d'axes de guidage (14) à des extrémités transversales opposées de ladite tête thermique, et le châssis inférieur ayant une paire d'évidements (27, 27') situés par rapport au rouleau d'impression de façon à assurer à la fois le parallélisme et la position relative entre ladite tête thermique et ledit rouleau d'impression qui peuvent être déterminés lorsque le châssis supérieur est abaissé et couplé audit châssis inférieur et les axes de guidages de la tête ont été reçus par lesdits évidements pour placer le système d'impression thermique prêt pour une opération d'impression.

FIG. 1
PRIOR ART

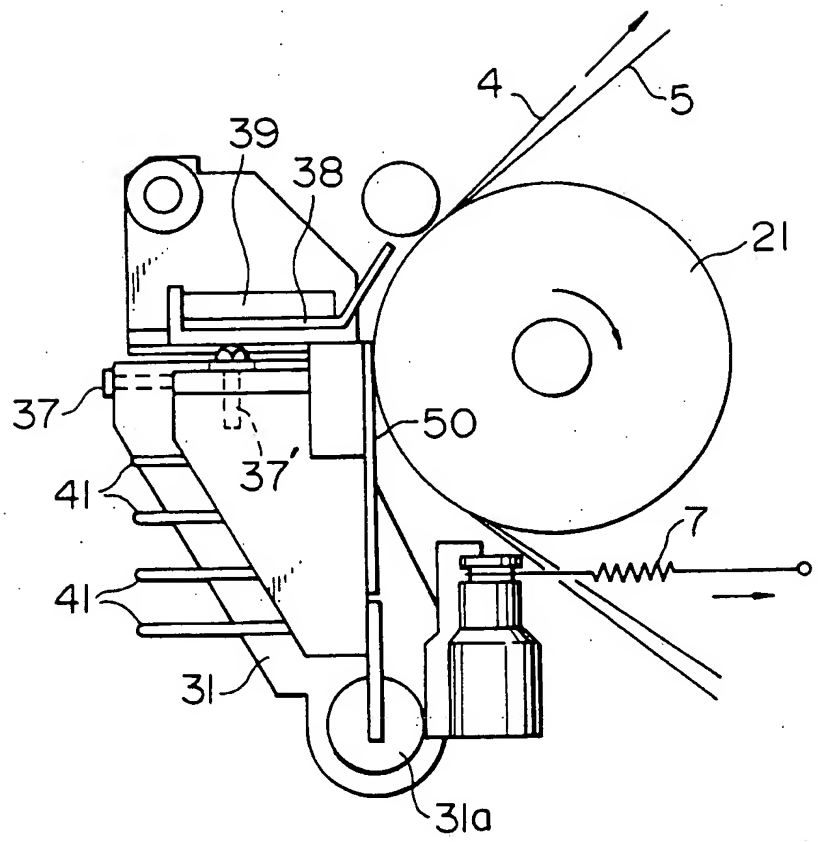

FIG. 2
PRIOR ART

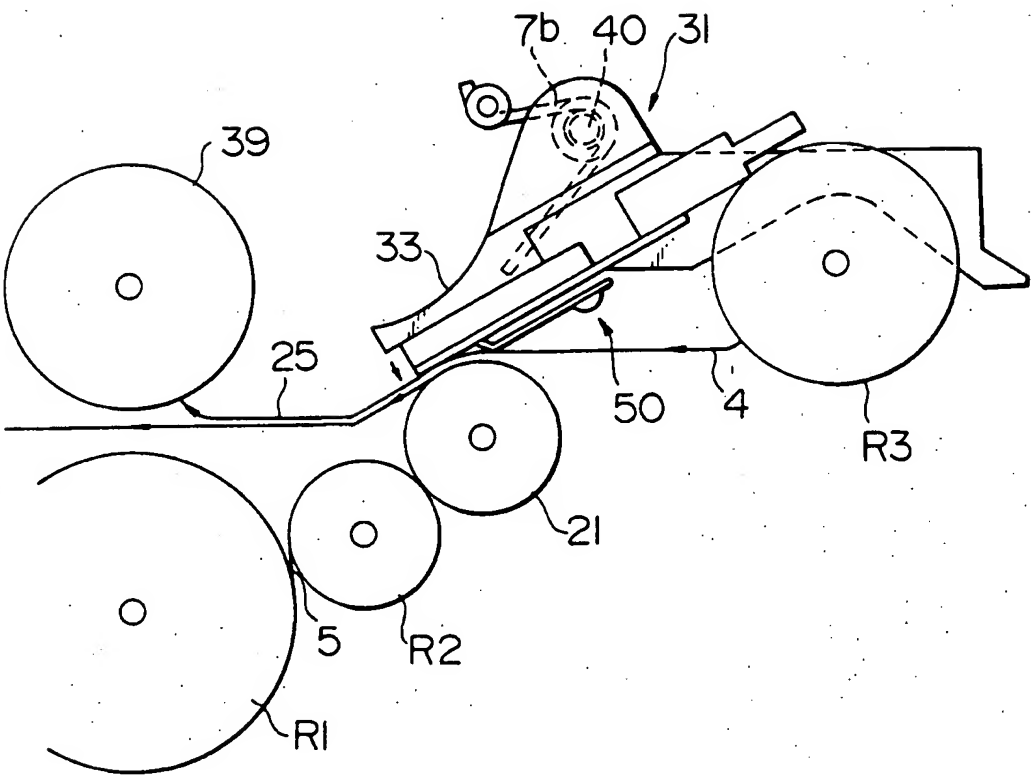

FIG. 3A

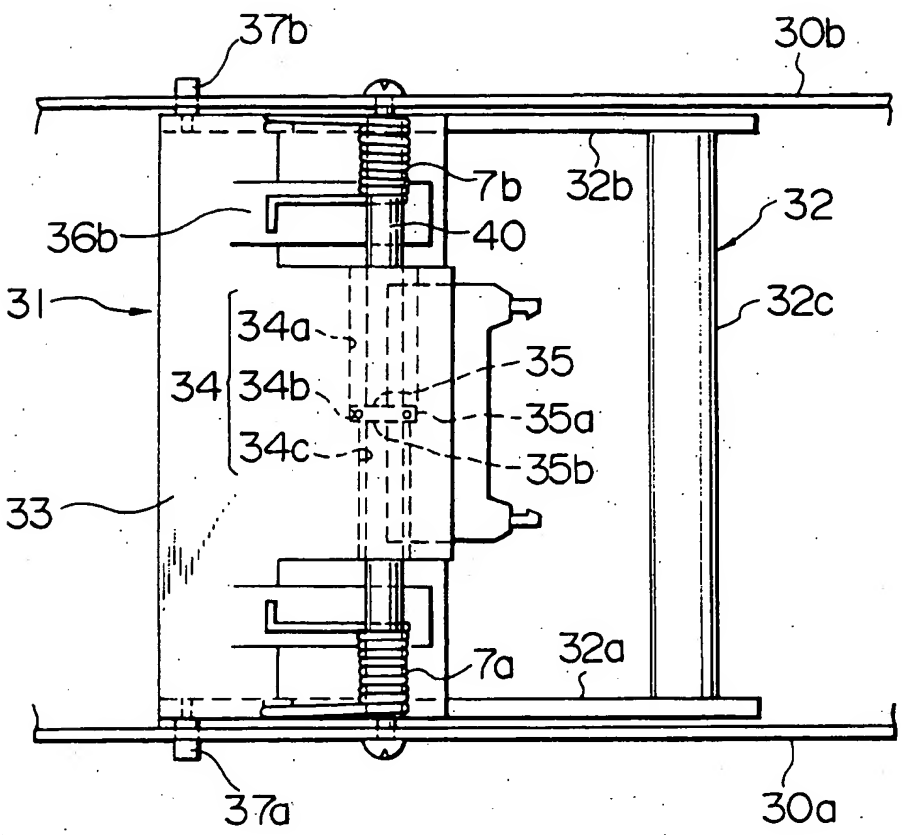
37b
30b
7b
32b
32
36b
40
31
32c
34a
35
34
34b
35a
34c
35b
33
7a
32a
37a
30a

FIG. 3B

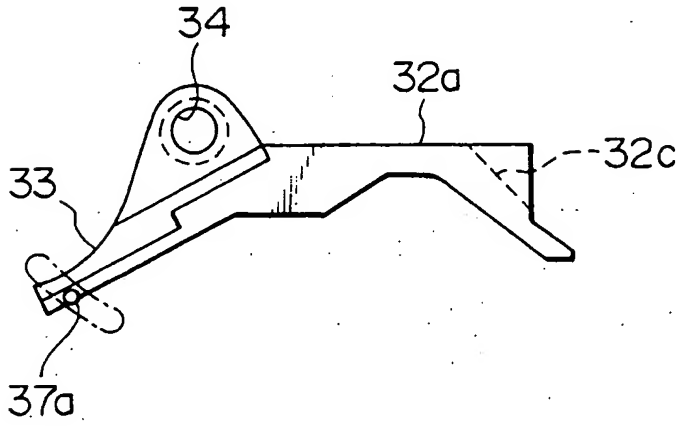
34
32a
32c
33
37a

FIG. 3C

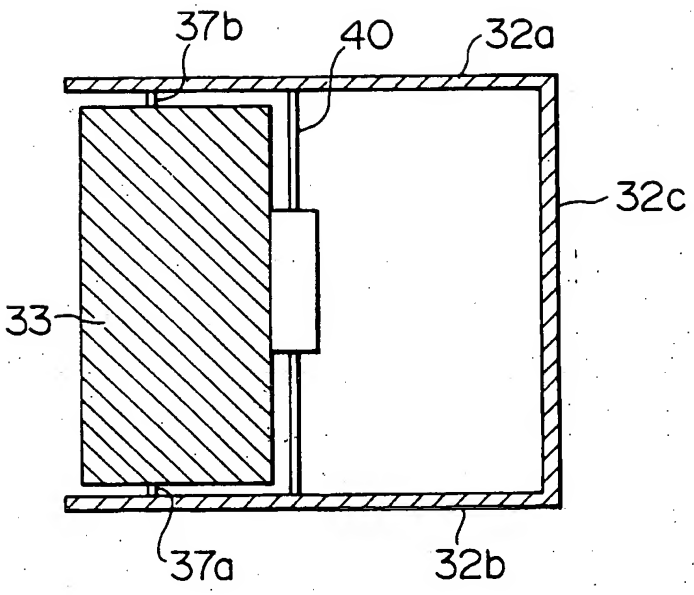

FIG. 4

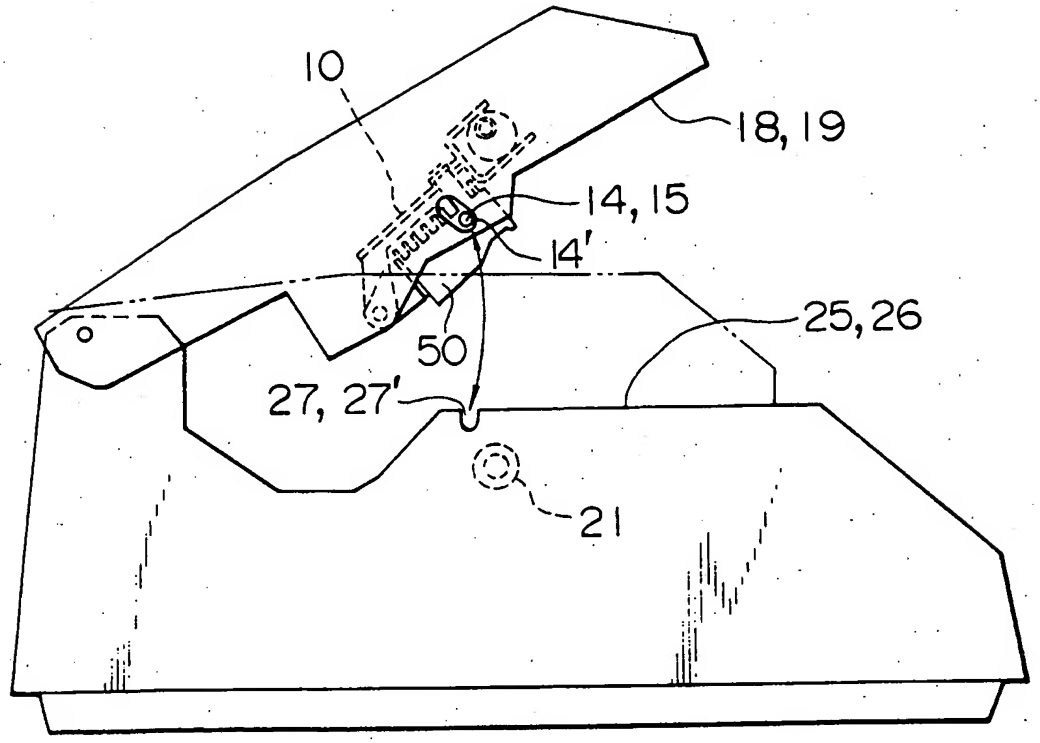

FIG. 5A

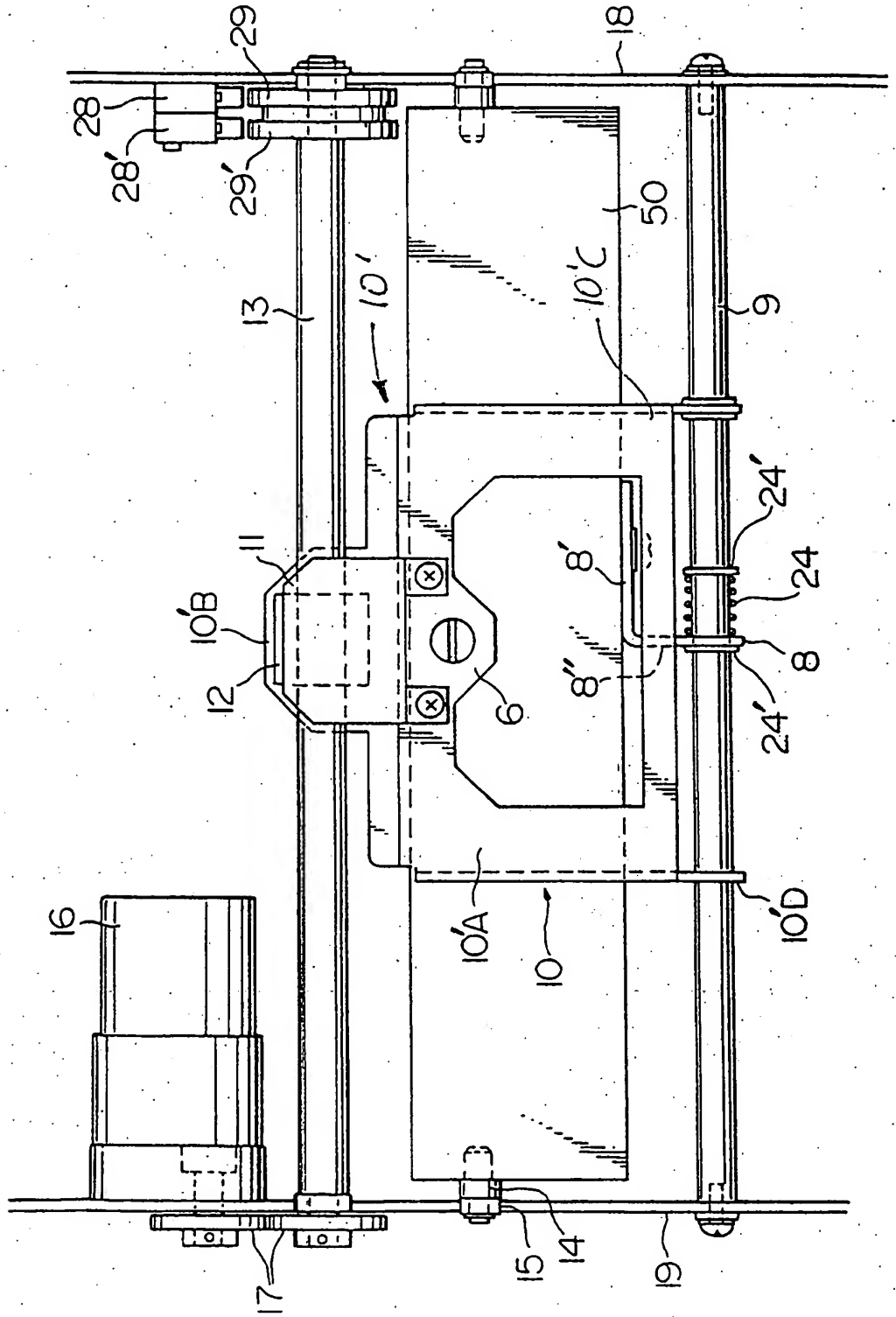
29
18
28
28'
29'
50
10'C
13
10'
9
24'
11
8'
24
10'B
8
12
8''
6
24'
10'D
16
10'A
10
15
14
19
17

FIG. 5B

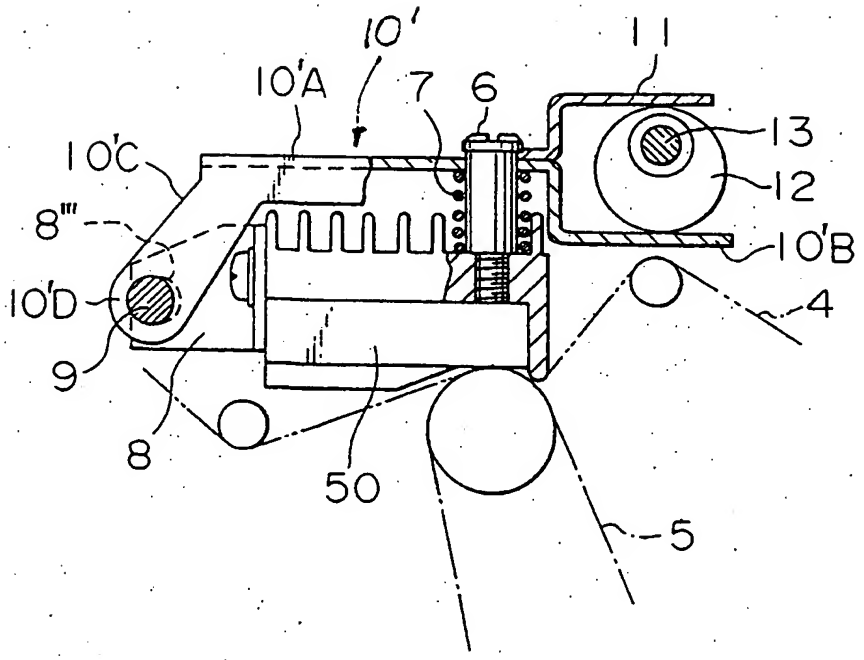

FIG. 5C